

CLAIM AMENDMENTS

What is claimed is:

1. (Currently Amended) A method in a network element comprising:
receiving link layer traffic encapsulated according to a link layer protocol at a link layer port;
demultiplexing the link layer traffic received via the link layer port into Point to Point Protocol over Ethernet (PPPoE) traffic, PPP over non-Ethernet (PPPoX) traffic, and non-PPP-traffic at a link layer demultiplexer;
forwarding non-PPP traffic received from the link layer demultiplexer using a virtual router coupled with the link layer demultiplexer;
converting PPPoX traffic received from the link layer demultiplexer into PPPoE traffic and converting PPPoE traffic received from a PPPoE multiplexer/demultiplexer into PPPoX traffic using a PPPoX proxy module;
switching PPPoE traffic received from the link layer demultiplexer and from the PPPoE multiplexer/demultiplexer using a PPPoE switch module; and
multiplexing PPPoE traffic received from the PPPoE switch module and the PPPoX proxy module using the PPPoE multiplexer/demultiplexer coupled with the PPPoX proxy module and the PPPoE switch module; and
demultiplexing PPPoE traffic into different traffic flows according to their session identifier using the PPPoE multiplexer/demultiplexer
converting Point to Point Protocol (PPP) protocol data-units (PDUs) encapsulated according to different protocols into PPP PDUs within a uniform Point-to-Point Protocol over Ethernet (PPPoE) encapsulation; and

transmitting the uniformly encapsulated PPPoE PDUs.

2. – 3. (Cancelled).

4. (Previously Presented) A network element comprising:

a link layer port to receive link layer traffic encapsulated according to a link layer protocol;

a link layer demultiplexer to demultiplex link layer traffic received via the link layer port into Point to Point Protocol over Ethernet (PPPoE) traffic, PPP over non-Ethernet (PPPoX) traffic, and non-PPP traffic;

a virtual router coupled with the link layer demultiplexer, to forward non-PPP traffic received from the link layer demultiplexer;

a Point to Point Protocol (PPP) switch module having,

a PPPoX proxy module to convert PPPoX traffic received from the link layer demultiplexer into PPPoE traffic and to convert PPPoE traffic received from a PPPoE multiplexer/demultiplexer into PPPoX traffic;

a PPPoE switch module to switch PPPoE traffic received from the link layer demultiplexer and from the PPPoE multiplexer/demultiplexer; and

the PPPoE multiplexer/demultiplexer coupled with the PPPoX proxy module and the PPPoE switch module, the PPPoE multiplexer/demultiplexer to multiplex PPPoE traffic received from the PPPoE switch module and the PPPoX proxy module and to demultiplex PPPoE traffic into different traffic flows according to their session identifier.

5. – 6. (Cancelled).

7. (Currently Amended) A machine-storage medium that provides instructions, which when executed by a set of one or more processors, cause said set of processors to perform operations in a network element comprising:

receiving link layer traffic encapsulated according to a link layer protocol at a link layer port;

demultiplexing the link layer traffic received via the link layer port into Point to Point Protocol over Ethernet (PPPoE) traffic, PPP over non-Ethernet (PPPoX) traffic, and non-PPP-traffic at a link layer demultiplexer;

forwarding non-PPP traffic received from the link layer demultiplexer using a virtual router coupled with the link layer demultiplexer;

converting PPPoX traffic received from the link layer demultiplexer into PPPoE traffic and converting PPPoE traffic received from a PPPoE multiplexer/demultiplexer into PPPoX traffic using a PPPoX proxy module;

switching PPPoE traffic received from the link layer demultiplexer and from the PPPoE multiplexer/demultiplexer using a PPPoE switch module; and

multiplexing PPPoE traffic received from the PPPoE switch module and the PPPoX proxy module using the PPPoE multiplexer/demultiplexer coupled with the PPPoX proxy module and the PPPoE switch module; and

demultiplexing PPPoE traffic into different traffic flows according to their session identifier using the PPPoE multiplexer/demultiplexer

converting ~~Point-to-Point Protocol (PPP) protocol data units (PDUs) encapsulated according to different protocols into PPP PDUs with a uniform Point-to-Point Protocol over Ethernet (PPPoE) encapsulation; and~~
transmitting the uniformly encapsulated PPPoE PDUs.

8. (Cancelled).

9. (Previously Presented) The method of claim 1, wherein the converting is performed by matching an entry in a data structure that provides a PPPoE session identifier for each PPP PDU to be converted.

10. (Previously Presented) The method of claim 9, wherein the data structure is not created until a proxy module within the network element attempts to create an entry in the data structure.

11. (Previously Presented) The method of claim 9, wherein the data structure is modified to indicate that a subscriber side flow is active once a PPP session is opened.

12. (Previously Presented) The method of claim 1, further comprising:
receiving PPP PDUs with the uniform encapsulation at a set of one or more aggregator side ports; and
converting the PPP PDUs with the uniform encapsulation back into PPP PDUs encapsulated according to different protocols.

13. (Previously Presented) The method as in claim 1, wherein the network element is agnostic of the encapsulation of the PPP PDUs to be converted.

14. – 21. (Cancelled).

22. (Previously Presented) The network element of claim 4, wherein the PPPoX proxy module is to convert the PPPoX traffic by matching an entry in a data structure that provides a PPPoE session identifier for the PPPoX traffic to be converted.

23. (Previously Presented) The network element of claim 22, wherein the data structure is not created until the PPPoX proxy module attempts to create an entry in the data structure.

24. (Previously Presented) The network element of claim 22, wherein the data structure is modified to indicate that the PPPoX traffic is active once a PPP session is opened.

25. (Previously Presented) The network element as in claim 4, wherein the network element is agnostic of the encapsulation of the PPPoX traffic received at the link layer port.

26. – 33. (Cancelled).

34. (Previously Presented) The machine storage medium of claim 7, wherein the uniform encapsulation is PPPoE encapsulation.

35. (Previously Presented) The machine storage medium of claim 7, wherein the converting is performed by matching an entry in a data structure that provides a PPPoE session identifier for each PPP PDU to be converted.

36. (Previously Presented) The machine storage medium of claim 35, wherein the data structure is not created until a proxy module within the network element attempts to create an entry in the data structure.

37. (Previously Presented) The machine storage medium of claim 35, wherein the data structure is modified to indicate that a subscriber side flow is active once a PPP session is opened.

38. (Previously Presented) The machine storage medium of claim 7 that provides instructions, which when executed by a set of one or more processors, cause said set of processors to perform operations further comprising :

receiving PPP PDUs with the uniform encapsulation at a set of one or more aggregator side ports; and

converting the PPP PDUs with the uniform encapsulation back into PPP PDUs encapsulated according to different protocols.

39 (Previously Presented) The machine storage medium of claim 7, wherein the network element is agnostic of the encapsulation of the PPP PDUs to be converted.

40. – 58. (Cancelled).